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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/058,100	01/29/2002	Masahiro Kihara	360842008300	1199

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EXAMINER

MENON, KRISHNAN S

ART UNIT	PAPER NUMBER
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1723

DATE MAILED: 10/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/058,100	KIHARA ET AL.	
	Examiner	Art Unit	
	Krishnan S Menon	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 18-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-17, drawn to method of desalination of water, classified in class 210, subclass 652.
- II. Claims 18-26, drawn to desalination apparatus, classified in class 210, subclass 321.72.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as apparatus and product made. The inventions in this relationship are distinct if either or both of the following can be shown: (1) that the apparatus as claimed is not an obvious apparatus for making the product and the apparatus can be used for making a different product or (2) that the product as claimed can be made by another and materially different apparatus (MPEP § 806.05(g)). In this case the apparatus as claimed is not an obvious apparatus for making the product and the apparatus can be used for making a different product like waste water treatment, and the product as claimed can be made by another and materially different apparatus like distillation

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

During a telephone conversation with Raj Dave, attorney for applicant on 9/22/03 a provisional election was made without traverse to prosecute the invention of group I, claims 1-17. Affirmation of this election must be made by applicant in replying to this Office action. Claims 18-26 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

Claim 15 is objected to because of the following informalities: The expression in the claim is " $15 \leq P(n + 1) / P(n) \leq 1.8$," which is logically incorrect and, the examiner believes, has a typographical error. The correct expression, as given in the specification should be " $1.15 \leq P(n + 1) / P(n) \leq 1.8$." Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 11, 12 and 16 are rejected under 35 U.S.C. 102(a/e) as being clearly anticipated by WO 01/14256 A1.

WO'256 teaches elements of the instant claims as follows:

Claim 1. (Amended) A method of desalinating water in a plurality of stages comprising membrane module units, wherein permeate water from a first stage membrane module unit is supplied to a second stage membrane module unit to obtain desalinated water therefrom, the method comprising (abstract, figure 1, page 2 line 17 – page 3 line 27):

processing at least a portion of a feed water having a total salt concentration of 3.0 to 4.8% by weight and a calcium ion concentration of 200 to 500 mg/l (page 2 line 30), wherein said at least a portion of the feed water is treated with the first stage membrane module unit to obtain the permeate water (page 2 lines 33- page 3 line 1) said permeate water being optionally mixed with an additional portion of the feed water to produce a second stage intake water (page 3 lines 1-6), the second stage intake water having a total salt concentration of about 55 to 90% of that of the feed water and a calcium ion concentration of about 95% or less of that of the feed water (page 3 lines 19-24; page 4 lines 17-27; page 7 lines 15-26; Table 7: salt concentrations in the feed water can be adjusted by varying the mixing proportions of untreated and softened water); and supplying the second stage intake water to the second stage membrane module unit, thereby obtaining the desalinated water (page 3 lines 1-6 and 19-24).

Claim 2: A method according to Claim 1, wherein the feed water has a sulphate ion concentration of 1500 to 3500 mg/l (ocean water: page 2 line 30) and the sulphate concentration is

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adjusted to 80% or less of that of the feed water by the first step (page 3 lines 19-24; page 4 lines 17-27; page 7 lines 15-26; Table 7: salt concentrations in the feed water can be adjusted by varying the mixing proportions of untreated and softened water)

Claims 3-5: the % of water treated in the first stage and then mixed with untreated water: see page 3 lines 19-24; page 4 lines 17-27; page 7 lines 15-26; Table 7: salt concentrations in the feed water can be adjusted by varying the mixing proportions of untreated and softened water .

Claim 11. A method according to Claim 1, wherein a nanofiltration membrane unit is used for the first stage membrane module unit and a reverse osmosis membrane unit is used for the second stage membrane module unit (fig 1).

12. A method according to Claim 11, wherein the first stage nanofiltration membrane module unit has at least first and second membrane components at respective first and second sub-stages of the first stage, each said membrane component providing permeate water and concentrate water and wherein concentrate water from a first sub-stage nanofiltration membrane module component is supplied to a second sub-stage nanofiltration membrane module component (page 2 lines 1-11; page 8 lines 10-13).

16. A method according to any one of Claims 11, wherein a scale prevention agent is injected into the water supplied to the nanofiltration membrane module unit before performing nanofiltration (page 7 lines 27-31).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO'256.

WO'256 teaches all the limitations of claim 1. Instant claims add further limitations which WO is silent, as follows:

Claims 6 and 7 recites the recovery (amount of permeate expressed as % of total water supplied) of the permeate from the first stage. Page 8 lines 14-33 teaches use of operating pressure, etc., for the yield (or recovery). This is a result effective variable, and it would be obvious to one of ordinary skill in the art at the time of invention that the NF recovery could be optimized.

Discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. In re Boesch and Slaney, 205 USPQ 215 (CCPA 1980); In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977); In re Aller, 42 CCPA 824, 220 F.2d 454, 105 USPQ 233 (1955).

Similarly, claims 8-10 recites recovery from the RO plant (overall recovery), which is also a result effective variable and within the skill of one of ordinary skill in the art (In re Boesch and Slaney...)

2. Claims 13-15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO'256 in view of WO 99/16714

WO'256 teaches all the limitations of claim 11. Instant claims add further limitations on which WO'256 is silent, but WO'714 teaches as follows:

Claim 13. A method according to Claim 11, wherein the second stage reverse osmosis membrane module unit has at least first and second membrane components at respective first and

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second sub-stages of the second stage, each said membrane component providing permeate water and concentrate water and wherein concentrate water from a first sub-stage reverse osmosis membrane module component is supplied to a second sub-stage reverse osmosis membrane module component (see figure 2). It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of WO'174 in the teaching of WO'256 because WO'256 does not give the arrangement of modules in second stage, and WO'256 is an improvement on WO'174 (page 7 lines 1-14).

17. A method according to Claim 1, wherein the feed water is filtered water processed with a microfiltration membrane or an ultrafiltration membrane (page 3 lines 15-20). It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of WO'174 in the teaching of WO'256 because WO'256 does provide details of reducing SDI of feed water (in page 8 lines 8-10), and WO'256 is an improvement on WO'174 (page 7 lines 1-14).

3. Claims 13-15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO'256 in view of WO 99/16714 as applied to claim 13 above and further in view of EP 0 709 130 A1

Claim 14. A method according to Claim 13, wherein the pressure of concentrate water from the first sub-stage reverse osmosis membrane module component is boosted and the concentrate water then supplied to the second sub-stage reverse osmosis membrane module component to obtain desalinated water.

Claim 15. A method according to Claim 14, wherein, in a plurality of sub-stages at which reverse osmosis membrane module components are disposed, the relation between the operating pressure $P(n)$ of the first sub-stage reverse osmosis membrane module component and the operating

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pressure (P_{n+1}) of the second sub-stage reverse osmosis membrane module component is in a range given by the expression

$$1.15 \leq P_{(n+1)} / P_{(n)} \leq 1.8.$$

WO'256 in view of WO'174 does not teach a booster pump as in claim 14 or the expression as in claim 15. EP teaches a booster pump in a multistage RO (Fig 1) and the expression (claim 13). It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of EP'130 in the teaching of WO'256 in view of WO'174 to boost the pressure of concentrate to the second substage because it will provide the pressure optimization as taught by WO'256 (page 7 lines 12-14)

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S Menon whose telephone number is 703-305-5999. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L Walker can be reached on 703-308-0457. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Krishnan Menon
Patent Examiner


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